* Adding a second power source to our gas sensing system with an MQ-2 B33 gas sensor and a Raspberry Pi Pico can help ensure stability and reliability for our project. Below are the steps we can take to add a battery pack as a second power source:
* Power considerations:

The Raspberry Pi Pico typically operates at 3.3V or 5V. - The MQ-2 gas sensor usually operates at 5V.

* Selection of battery pack

We would consider a 4xAA for a 6V pack, or a single 3.7V LiPo battery or if the batteries of these voltage values are not available, a 9V battery can also be used but we have to use a DC-DC buck converter to step down to 5V.

* Use Schottky Diodes to Isolate Power Sources:

We have to make sure that the power sources do not feed each other to create a stable power system, to do this we would use a 1N5819 Diode Schottky rectifier

Benefits of using the 1N5819 Diode Schottky rectifier:

1. Low Forward Voltage Drop

The typical forward voltage drop for the 1N5819 is around 0.2V to 0.45V, compared to silicon diodes whose forward voltage drop is typically around 0.6 to 0.7 volts. This lower voltage drop results in efficient power regulation.

1. Fast switching speed.

Switching speeds upto 2 Mhz

* Connecting to the diodes

Primary Power Source (Computer port) ---- D1 (Anode to Source, Cathode to Load) ----> Combined 5V line

Battery Pack ---- D2 (Anode to Source, Cathode to Load) ----> Combined 5V line

* Wiring the Power Sources Together:

1. Connect the grounds (GND) from both the primary power source and the battery pack together.
2. 5V Connection: Connect the combined output after the diodes to the 5V input of your sensors and the Raspberry Pi Pico.

Other considerations:

* We would add capacitors to smooth out any potential power fluctuations, if needed.
* To check if the Raspberry Pi Pico correctly initializes and communicates with the MQ-2 sensor, as expected.

Referred From:

<https://www.diodes.com/assets/Datasheets/1N5817-1N5819.pdf>

<https://forums.raspberrypi.com/viewtopic.php?t=55532>

<https://www.reddit.com/r/raspberrypipico/comments/xe709q/providing_constant_power_to_the_pi_pico/>

<https://raspberrypi.stackexchange.com/questions/3778/dual-power-supplies-redundant-spare-backup>